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(71) Applicant(s):
Motorola Inc
(Incorporated in USA - Delaware)
1303 East Algonquin Road, Schaumburg,
Illinois 60196, United States of America

(72) Inventor(s):
Yehuda Yukler
Meir Ben-Non
Moshe Yosef

(74) Agent and/or Address for Service:
Optimus
Grove House, Lutyens Close,
Chineham Court, BASINGSTOKE,
Hampshire, RG24 8AG, United Kingdom

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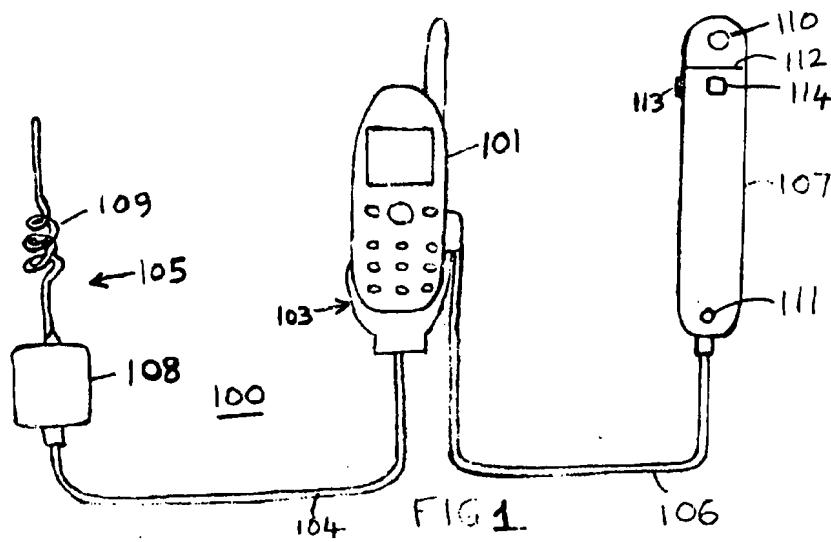
(56) Documents Cited:
GB 2280336 A EP 0459346 A2
EP 0310318 A2 WO 2004/ 100505 A1
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(58) Field of Search:
UK CL (Edition X) H4J
Other: WPI, EPODOC

(54) Abstract Title: Auxiliary handset accessory kit and method for a radio telephone in a vehicle

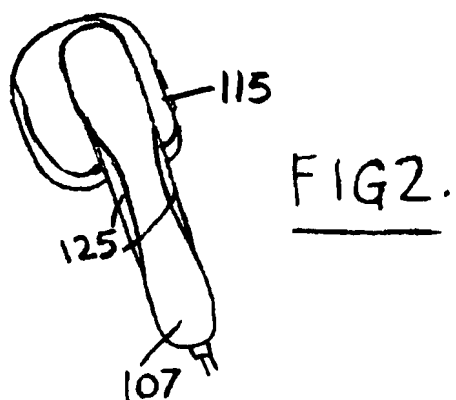
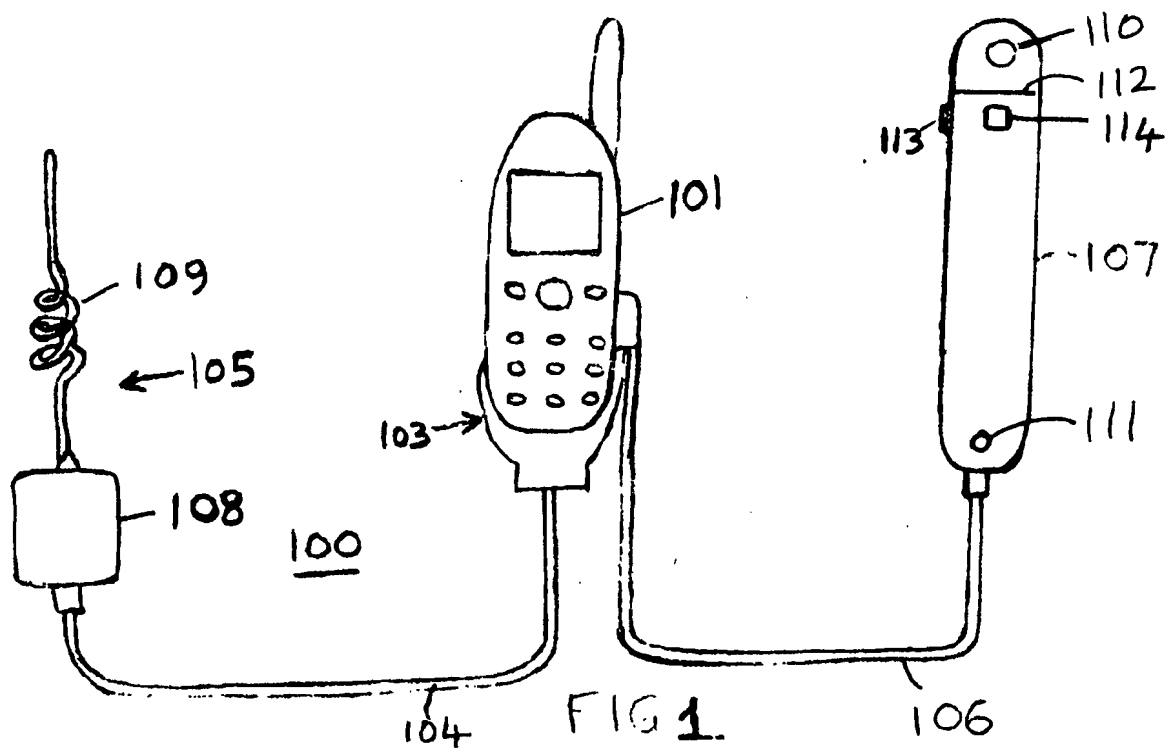
(57) An extension accessory for use with a mobile radio telephone 101 in a vehicle is connectible to the radio telephone to provide auxiliary input and output audio transducers 110, 111 for speech input and output by a user. The extension accessory comprises a handset 107 which may include a PTT switch as well as a microphone 111 and speaker 110. A magnetic reed switch (116, 117; fig 3) is used to detect the position of the accessory handset on a holder or cradle. Another cradle or holder 103 couples the mobile radio telephone 101 to an auxiliary antenna 105.

Also described is a kit 100 which includes the mobile radio telephone and the extension accessory and a method of using the kit to provide radio communication.



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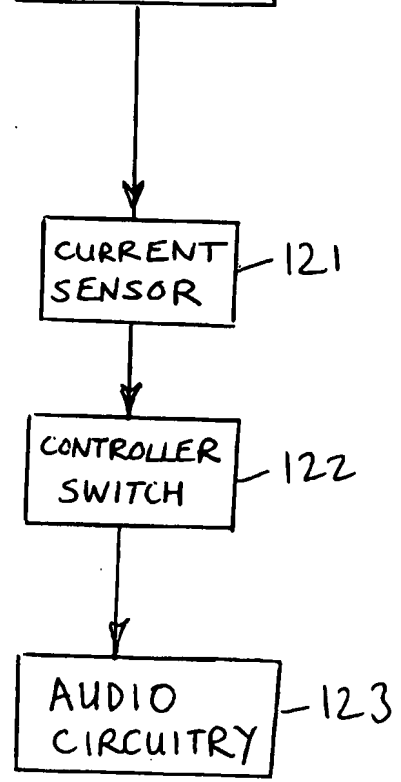
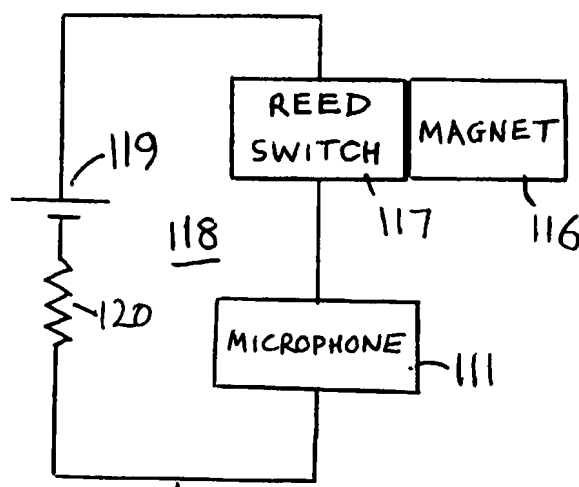


FIG 3.

**TITLE: ACCESSORY, KIT AND METHOD FOR RADIO COMMUNICATION
IN A VEHICLE**

FIELD OF THE INVENTION

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The present invention relates to an accessory, a kit and a method for radio communication in a vehicle.

BACKGROUND OF THE INVENTION

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Portable mobile telephones and radios for radio communication (herein collectively referred to 'mobile radio telephones') such as those operating in a cellular communication system can be connected to an adaptor kit when used in a vehicle. A known adaptor kit includes a holder usually fixed to an interior member of the vehicle for holding the telephone, an extension headset (or visor device) connected to the telephone for allowing a user to take part in a conversation in a hands free mode and a connection from the telephone to an external antenna to improve transmission and reception of radio signals.

Known vehicle adaptor kits of the kind described have several disadvantages. They are often designed to be used by only one person at a time, usually the driver. It is cumbersome to switch use of the extension headset from one person to another. It is not always simple to connect the headset extension to the telephone particularly by the driver when the vehicle is moving since the plug and socket connector between the extension headset and the telephone is usually very

small (e.g. 2.5 mm wide) and fitting of the connector parts needs care and attention. Use of the extension headset can lead to a significant reduction of the quality of the input and output audio signals especially
5 in a noisy environment. Changing between the hands free and hand held modes of use of the telephone requires insertion and removal of the telephone handset in and from its holder. Each insertion step requires an initialisation process (which involves running an echo
10 cancellation algorithm for a few seconds) to take place at the vehicle adaptor and this causes an operational delay. Also, frequent changing between the two modes can cause wear of the contact parts of the telephone handset and its holder within the adaptor.

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SUMMARY OF THE INVENTION

According to the present invention in a first aspect there is provided an extension accessory for use
20 with a mobile radio telephone in a vehicle, the extension accessory being as defined in claim 1 of the accompanying claims.

According to the present invention in a second aspect there is provided a kit for mobile communications
25 in a vehicle, the kit being as defined in claim 12 of the accompanying claims.

According to the present invention in a third aspect there is provided a method of providing radio communication in a vehicle, the method being as defined
30 in claim 17 of the accompanying claims.

Further features of the invention are described in the accompanying dependent claims and in the description of embodiments of the invention, which follow later in this description.

5 By the invention, an extension accessory connected to a mobile telephone for making and receiving calls especially in a vehicle comprises a handset rather than a conventional headset. The handset of the invention provides several user benefits by overcoming or reducing
10 the disadvantages of the prior art as described earlier. The use of the handset allows a user to change between a hands free mode and a hand held mode without the need to insert or remove the mobile radio telephone in or from its vehicular adaptor at each mode change, thus avoiding
15 operational delay and component wear caused by such mode changing and also avoiding any need to fit the connection between the telephone and the adaptor whilst the vehicle is moving. Also, the quality of signals fed to and from the extension accessory is better than for
20 signals obtained with a prior art extension headset especially when the user has to use the headset in noisy conditions. Furthermore, the handset may easily and conveniently be passed between users in the vehicle to allow different users to make and receive calls.
25 Additionally, the benefits obtained by use of an auxiliary antenna connected to the mobile telephone can still be obtained with the extension handset connected to the mobile radio telephone.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front view of an arrangement of radio communication kit embodying the invention.

5 FIG. 2 is a rear perspective view of a handset extension accessory of the kit arrangement of FIG. 1 and fitted in a holder.

FIG. 3 is a schematic circuit diagram of an arrangement for sensing whether the handset extension
10 accessory and holder shown in FIG. 2 are placed together and for controlling connection of audio circuitry in a radio telephone of the arrangement of FIG. 1.

DESCRIPTION OF EMBODIMENTS OF THE INVENTION

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FIG. 1 is a front view of an arrangement of radio communication kit 100 embodying the invention. The kit 100 is for use in a moving vehicle (not shown). The kit 100 includes a conventional mobile (cellular) telephone
20 101 which is fitted in an attachment housing 103 which can be fixed in position in the vehicle. The attachment housing 103 facilitates connection to the telephone 101 of a connector cable 104 leading to an auxiliary antenna 105 and also a connector cable 106 leading to an
25 auxiliary extension accessory which in accordance with an embodiment of the invention is a handset 107. The conductors of the connector cable 106 are connected to the telephone 101 at its external headset connection jack.

30 The auxiliary antenna 105 includes a connector portion 108 which can be fitted to a wall of the vehicle

and a partly coiled portion 109 which projects externally to the vehicle and provides an external radiator.

5 The auxiliary handset 107 may be used by people inside the vehicle to make and receive telephone calls via the mobile telephone 101. The handset 107 has a speaker 110 serving as an audio output from the handset 107 and a microphone 111 serving as an audio input to the handset 107. The speaker 110 is provided on a
10 portion 112 of the handset 107 that is raised to facilitate close placement of the speaker by a user's ear. The microphone 111 is positioned on the handset 107 an optimal distance from the speaker 110 which is selected to match an average distance between a user's
15 ear and mouth. The handset 107 includes a PTT button 113 which allows dispatch calls to be made using the handset 107 and also for a user to receive an incoming call by picking up the handset 107 and pressing the PTT button. The handset 107 also includes a projection 114 which
20 serves as a catch to allow the handset 107 to be held in position when the handset 107 is not in use and is placed in a holder 115. The handset 107 is shown placed in the holder 115 in FIG. 2. The holder is cradle shaped or cup shaped and has a face providing a suitable
25 concave receptacle for a top portion of the handset 107. Also shown in FIG. 2 are chamfers 125 on a holder portion of the handset 107 to facilitate holding of the handset by a user.

30 An arrangement for detecting whether or not the handset 107 is placed in the holder 115 is shown in FIG. 3. The holder 115 includes a magnet 116 and the handset

107 includes a complementary reed switch 117. The reed switch 117 is included in a circuit 118 inside the handset 107 which also includes the microphone 111. The circuit 118 is connected via a conductor of the cable 106 (FIG. 1) to a battery 119 inside the mobile telephone 101 which is able to provide a current flow (which is typically a few milliamps) in the circuit 118 via a resistor 120.

When the handset 107 is placed in the holder 115, magnetic strips of the reed switch 117 are deflected by attraction toward the magnet 116 and the reed switch is thereby put in an open state. No current flows in the circuit 118.

When the handset 107 is removed from holder 115, the magnetic strips of the reed switch 117 return to an undeflected position causing the reed switch 117 to be in a closed state. A current thereby flows in the circuit 118 through the microphone 111. This current is sensed by a current sensor 121 in the mobile telephone 101 which produces in response a control signal which is supplied to a controller switch 122 also inside the mobile radio telephone 101. The controller switch 122 switches audio circuitry 123 inside the mobile telephone 101 so that it is connected to receive audio inputs from the microphone 111 and provide audio outputs to the speaker 110 of the handset 107 rather than from a microphone and to a speaker fitted in the telephone 101. The control switch also activates operation of the PTT button 113 (FIG. 1).

The microphone 111 and the speaker 110 are designed to have a flat frequency response to enhance

pick up and delivery of audio signals by the handset
107.

CLAIMS

1. An extension accessory for use with a mobile radio
5 telephone in a vehicle, the accessory being connectible
to the radio telephone to provide auxiliary input and
output audio transducers for speech communication,
characterised in that the extension accessory comprises
a handset.
- 10 2. An extension accessory according to claim 1 wherein
the handset includes a handle portion for holding by a
user.
3. An extension accessory according to any one
preceding claim wherein the input and output transducers
15 of the handset comprise a microphone and a speaker
included in the accessory handset.
4. An extension accessory according to any one
preceding claim wherein the handset includes a push to
talk (PTT) switch.
- 20 5. An extension accessory according to any one
preceding claim including a holder for holding the
handset when not in use.
6. An extension accessory according to claim 5 wherein
the holder comprises a cradle which receives at least a
25 part of the handset.
7. An extension accessory according to claim 5 or
claim 6 including means for detecting when the handset
is separated from its holder.
8. An extension accessory according to claim 7 wherein
30 the means for detecting comprises a switch which is in
an open state when the handset is placed in the holder

and is in a closed state when the handset is removed from the holder.

9. An extension accessory according to claim 8 wherein the means for detecting comprises a reed switch and complementary magnet.
10. An extension accessory according to claim 8 or claim 9 wherein the handset includes a circuit in which current flows when the switch is closed.
11. An extension accessory according to claim 10 wherein the circuit includes the input transducer of the handset.
12. A kit for mobile communications in a vehicle comprising a mobile radio telephone and, connectible to the mobile radio telephone, an extension accessory including auxiliary input and output audio transducers for speech input and output by a user, wherein the extension accessory comprises a handset.
13. A kit according to claim 12 including a holder for the handset of the extension accessory.
14. A kit according to claim 12 or claim 13 including a holder for the mobile radio telephone.
15. A kit according to claim 12, claim 13 or claim 14 including an auxiliary antenna for attachment to the vehicle and connectible to the mobile radio telephone.
16. A kit according to claim 15 and including a holder for the mobile radio telephone providing a connection between the mobile radio telephone and the auxiliary antenna.
17. A method of providing radio communication in a vehicle including providing a mobile radio telephone, connecting an extension accessory to the mobile radio

telephone to provide auxiliary input and output audio transducers and providing speech input and output via the auxiliary input and output transducers, wherein the extension accessory comprises a handset.

- 5 18. A method according to claim 17 including connecting to the mobile radio telephone an auxiliary antenna external to the vehicle.
19. A method according to claim 18 including connecting the auxiliary antenna via a holder for the mobile radio
- 10 telephone.
20. A method according to any one of the preceding claims including detecting in the mobile radio telephone when the handset of the extension accessory is in use.
21. An accessory according to any one of claims 1 to 11
- 15 and substantially as herein described with reference to the accompanying drawing.
22. A kit according to any one of claims 12 to 16 and substantially as herein described with reference to the accompanying drawing.
- 20 23. A method according to any one of claims 17 to 20 and substantially as herein described with reference to the accompanying drawing.



Application No: GB0426570.8

Examiner: Peter Easterfield

Claims searched: 1 to 20

Date of search: 8 April 2005

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1-9, 12, 13, 17, 20	WO 04/100505 A1 (VALKONEN) whole document
X	1-3, 5-7, 12-14, 17, 20	DE 29918755 U1 (VASTAR) see figs & abstract
X	1-3, 5, 6, 12-14, 17, 20	EP 0459346 A2 (VOTRONIC) see figs & abstract
X	1-3, 5, 6, 12-20	GB 2280336 A (NEC) see prior art fig 6
X	1-3, 5, 6, 12-20	EP 0310318 A2 (TOSHIBA) see prior art fig 9

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X:

H4J

Worldwide search of patent documents classified in the following areas of the IPC⁰⁷

The following online and other databases have been used in the preparation of this search report

WPI, EPODOC